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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,697	11/17/2003	Graeme R. Addie	G003 1011.1	5367
26158	7590	03/16/2005	EXAMINER	
WOMBLE CARLYLE SANDRIDGE & RICE, PLLC			EDGAR, RICHARD A	
P.O. BOX 7037			ART UNIT	
ATLANTA, GA 30357-0037			PAPER NUMBER	
			3745	
DATE MAILED: 03/16/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

501

Office Action Summary

Application No.

10/714,697

Applicant(s)

ADDIE ET AL.

Examiner

Richard Edgar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/17/03 under 37 CFR §1.53(b).
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/24/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

Figures 1, 2, 3, 4 and 5 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

The drawings are objected to because Figures 2, 3, 5, 6 and 7 do not have hatching in the sectional views (see 37 C.F.R. § 1.84(h)(3)).

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 6 and 11.

Figures 8 and 9 use numbers which are less than 1/8 inch in height (see 37 C.F.R. § 1.84(p)(3)).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New

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Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification. Applicant's attention is specifically drawn to the reference numerals used in the specification not being consistent through the specification, and the reference numerals also not corresponding to the drawings.

Claim Objections

Claims 4 and 20 are objected to because of the following informalities:

In claim 4, line 2, -- plurality of -- should be inserted before "protrusion".

In claim 20, line 2, "44^o" should be -- 45° --. Appropriate correction is required.

Applicant is advised that should claims 6, 7, 8, and 9 be found allowable, claims 17, 18, 19 and 20 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 6 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 6 and 17 each recite the limitation "the impeller nose gap" in lines 1-2. There is insufficient antecedent basis for this limitation in the claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 11-13 are rejected under 35 U.S.C. 102(b) as being anticipated by United States Patent No. 5,984,629 (Brodersen et al. hereinafter).

Brodersen et al. teach in Figure 1 and Figure 3 an apparatus which when operated, decreases the number of particles that pass through the impeller nose gap 10 of a slurry pump by clearing a portion of particle laden liquid from the impeller nose gap 10 comprising the steps of: diverting the portion of the particle laden liquid to a clearing area 13; and pumping the diverted particle laden liquid from the clearing area and into a main volute collector 8. The diverted particle laden liquid is pumped using centrifugal

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force. The step of diverting the portion of particle laden liquid to a clearing area includes diverting the portion of particle laden liquid away from a suction liner face 7.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4, 5, 7, 10, 14-16 and 18, and as far as claims 6 and 17 are definite, are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 5,984,629 (Brodersen et al. hereinafter) in view of United States Patent No. 2,013,499 (Meckenstock hereinafter).

Brodersen et al. disclose in Figures 1 and 8 a diverter for reducing wear in a slurry pump comprising: an impeller front shroud 5; a suction liner face 7 operatively opposed to the impeller front shroud 5; and a protrusion 17 extending from the suction liner face substantially to the front shroud whereby particles can be deflected away from the suction liner face.

The impeller front shroud 5 comprises clearing vanes 19.1, 19.2. The clearing vanes further include a relief 21, 22 with the protrusion 17 extending into the relief formed within the clearing vanes.

A gap is formed between the protrusion and the impeller front shroud having a value of 2.0 mm (col. 4, line 5).

The protrusion 17 is positioned upstream of the impeller nose gap 10, relative to the fluid flow between the impeller shroud 5 and the suction liner face 7.

The protrusion 17 has an axially outer edge and an axially inner edge.

The slurry pump is a centrifugal pump comprising a shell (see Fig. 1).

Brodersen et al. also disclose in Figures 1 and 8 a diverter for reducing the number of particles that pass through an impeller nose gap 10 of a slurry pump by diverting the particles to an impeller front shroud 5 having clearing vanes 19.1, 19.2, the diverter comprising: a suction liner face 7 operatively opposed to the impeller front shroud 5; and a protrusion 17 extending from the suction liner face and into the clearing vanes.

The clearing vanes include a relief 21, 22 cooperating with the protrusion 17.

A gap is formed between the protrusion and the impeller front shroud having a value of 2.0 mm (col. 4, line 5).

Brodersen et al. only disclose one protrusion 17 extending from the suction liner face 7, and therefore not a plurality of protrusions.

Meckenstock discloses a slurry pump having a plurality of seals 34, 35 arranged on a suction liner face 8, 8a for the purpose of progressively sealing the pump.

Since Brodersen et al. show a seal for a centrifugal slurry pump and Meckenstock teach a centrifugal slurry pump should have a plurality of seals, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the invention of Brodersen et al. to have a plurality of seals as taught by Meckenstock for the purpose of progressively sealing the pump.

Furthermore, the examiner submits the use of a *plurality of protrusions* is a mere duplication of a *single protrusion*, and has no patentable significance since no new and unexpected result is produced. See *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960). One skilled in the art at the time the invention was made would expect a progressively increasing diverting of fluid as a plurality of protrusions are added.

Claims 3, 8 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 5,984,629 (Brodersen et al. hereinafter) in view of United States Patent No. 2,013,499 (Meckenstock hereinafter) as applied to claims 2, 7 and 18, respectively, above, and further in view of a design choice.

The modified Brodersen et al. (Brodersen et al. in view of Meckenstock) discloses a centrifugal slurry pump with a plurality of protrusions 17 extending into clearing vane reliefs 21, 22 on the impeller front shroud 5. Neither the depth of the clearing vanes 19.1, 19.2 relative to the front shroud 5 thickness, nor the distance

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between the inner edge of the protrusion 17 relative to the impeller front shroud 5 thickness are taught as 50-100% and 25-100%, respectively.

At the time the invention was made, it would have been an obvious matter of design choice to a person having ordinary skill in the art to make the depth of the clearing vanes 50-100% of the shroud thickness or the distance between the inner edge of the protrusion and the shroud be 25-100% of the shroud thickness, because Applicant has not disclosed that a clearing vane depth of 50-100% of the shroud thickness, and the distance between the inner edge of the protrusion and the shroud being 25-100% of the shroud thickness, provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with other dimensions because the dimensions of a pump are chosen based on a number of variables including pump material, operating temperature, operating speed, substance being pumped, and other forces that cause stress on the pump and pump impeller.

Therefore, it would have been an obvious matter of design choice to further modify Brodersen et al. to obtain the invention as specified in claims 3, 8 and 19.

The above design choice rejection establishes a *prima facie* case of obviousness since the examiner has presented a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references (Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985)).

Claims 9 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 5,984,629 (Brodersen et al. hereinafter) in view of United States Patent No. 2,013,499 (Meckenstock hereinafter) as applied to claims 7 and 18 above, respectively, and further in view of Japanese Laid-open Patent Application No. 60-53699 (Nishizawa hereinafter).

The modified Brodersen et al. (Brodersen et al. in view of Meckenstock hereinafter) discloses a centrifugal slurry pump with a plurality of protrusions 17 extending into clearing vane reliefs 21, 22 on the impeller front shroud 5. Neither of the references shows the protrusions arranged at an angle of about 45°.

Nishizawa show a centrifugal pump with a plurality of diffusers 15 arranged on the pump sidewall 14, wherein as seen in Figure 7, the diffusers 15 have a rounded tip and extend at an angle of about 45° with respect to the sidewall 14 for the purpose of reducing the leakage of fluid between the sidewall 14 and the impeller 12, 13 shroud.

Since the modified Brodersen et al. teach a centrifugal slurry pump with a plurality of protrusions extending to the impeller shroud, and Nishizawa teaches a plurality of protrusions for a centrifugal pump being inclined at a 45° angle with respect to the pump sidewall, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to further modify the protrusions of the modified Brodersen et al. to be inclined at a 45° angle for the purpose of reducing the leakage of fluid between the sidewall and the impeller shroud.

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Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Edgar whose telephone number is (571) 272-4816. The examiner can normally be reached on Monday thru Friday, 8:00 am until 4:00 pm EST.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Richard Edgar
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RE



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3/14/05